

**Project Fiche – 2008 IPA horizontal programme
on nuclear safety and radiation protection**

1. Basic information

- 1.1 CRIS Number:** 2008/020-350
- 1.2 Title:** Strengthening radiation safety capabilities and infrastructure
- 1.3 ELARG Statistical code:** 03.64 - Nuclear safety
- 1.4 Location:** Vinča Institute in Serbia

Implementing arrangements:

1.5 Contracting Authority:

The European Community represented by the Commission of the European Communities for and on behalf of Serbia in joint management with the International Atomic Energy Agency (IAEA).

1.6 Implementing Agency:

The International Atomic Energy Agency (IAEA), Technical Co-operation Department

1.7 Beneficiary:

The Republic of Serbia
Institute of Nuclear Sciences
11001, Belgrade, P.O Box 522
Dr. Jovan Nedeljkovic, Director General

Financing:

1.8 Overall cost (VAT excluded): EUR 173 000

1.9 EU contribution: EUR 163 000

1.10 Final date for contracting: 2 years following the date of conclusion of the Financing Agreement.

1.11 Final date for execution of contracts: 2 years after the end date for contracting.

1.12 Final date for disbursements: 3 years after the end date for contracting.

2. Overall Objective and Project Purpose

2.1 Overall Objective:

To improve radiation protection and emergency preparedness at the Vinča Institute in line with best EU practices and the Community acquis.

2.2 Project purpose:

To contribute to the implementation of the Vinča Nuclear Institute Decommissioning project (VIND) that is coordinated and partly supported by the IAEA through the enhancement of the radiation protection and emergency preparedness capabilities of the Vinča Institute.

2.3 Link with AP/NPAA/EP/SAA

Article 110 of the draft SAA with the Republic of Serbia explicitly mentions nuclear safety as one of the cooperation topics.

The Serbia 2007 progress report mentions that "little progress has been made in the area of nuclear safety and radiation protection. The dismantling operations and removal of spent fuel from the Vinča research reactor are in progress, but faces numerous difficulties. However Serbia has not yet acceded to the Convention on Nuclear Safety and to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management".

2.4 Link with MIPD

The MIPD action entitled "Nuclear Safety and Radiation Protection" mentions that there are "specific problems posed by the management of radioactive waste and spent nuclear fuel in Serbia". In this context, the MIPD intends to support "further alignment of the management practices of radioactive materials with EU best practices".

2.5 Link with National/Sectoral Investment Plan

- Decision of the Serbian government to decommission the RA research reactor located at the Vinča Institute and approval of the VIND programme (2002 and 2004)
- Activity framework in the field of nuclear safety and radiation protection for the period 2008-2010 decided by the government of Serbia.

3. Description of project

3.1 Background and justification:

Operation of the RA nuclear research reactor at Vinča until 1983 has generated spent nuclear fuel and many types of radioactive waste that need to be properly managed. This is the main aim of the VIND programme that was established in 2002 based on a decision of the Serbian government to decommission the Vinča RA research reactor. The VIND programme comprises a number of successive phases of implementation that are covering the period 2006-2013.

Management of spent nuclear fuel is considered as the most urgent problem to be solved and therefore the three first phases addressed the characterisation, repackaging, transport to the Russian Federation and reprocessing operations. It is important to note that phase 2 (transport of spent nuclear fuel to the Russian Federation) will be funded by the 2007 IPA horizontal programme on nuclear safety and radiation protection.

Management of radioactive waste to be generated during the decommissioning and dismantling of the RA research reactor constitutes also an important radiological issue and phases 4 and 5 of the VIND programme are devoted to the transformation of an old building into a waste treatment and conditioning facility. Funding of the equipment to be installed into this facility is also part of the 2007 IPA horizontal programme on nuclear safety and radiation protection.

However proper management of radioactive waste stored at the Vinča Institute requires additional phases to be implemented over the period 2009-2011, i.e.

Phase 6: Conditioning, packaging and storage of disused sealed radioactive sources;

Phase 7: Conditioning and processing of improperly stored and unconditioned radioactive waste;

- Phase 8: Decommissioning of the old storage facilities for sources and radioactive waste;
- Phase 9: Dismantling of the old piping system and tanks containing radioactive liquid waste, and
- Phase 10: Radioactivity survey of the Vinča site.

Several donor countries (e.g. the USA, Norway) have already expressed their intention to contribute to the funding of these activities as well as the IAEA. However the funds that are expected to be collected are still far from the needs already identified.

Therefore the aim of this project is to contribute to the VIND programme via a specific support to be allocated to the Vinča departments dealing with radiation protection and emergency preparedness.

Since the different phases of implementation of the VIND programme may incur radiological risks notably for the personnel of the Institute, it is of paramount importance that appropriate measures are taken to back-up these activities through a targeted support to the departments in charge of radiation protection and emergency preparedness.

It must be underlined that the VIND programme is implemented with close technical and safety support of IAEA experts. In this context some of necessary administrative safety elements have been already developed or they are about to be finished, such as QMS procedures, general Radiation Protection Plan, Emergency Response Plan etc. But still there are needed for their operational effective implementation through:

- Completion of procedures, guides and standards and other relevant infrastructure elements
- Adaptation of proper offices and laboratories, preparing effective control, monitoring and response center, equipped with laboratories, communication center, meeting rooms, regulatory body offices, etc.
- Analysis, selection, purchase and implementation of the appropriate software for radiation safety assessments
- Analysis, selection, purchase and implementation of the appropriate equipment for working area monitoring and emergency response
- Defining manual and generic procedures for emergency response

3.2 Assessment of project impact, catalytic effect, sustainability and cross border impact

The project should contribute to reduce occupational exposure of the personnel that is implementing the VIND programme as well as the consequences of a possible nuclear accident that would lead to a significant contamination of air and the environment.

It has a catalytic effect in the sense that providing funding to phase 9 of the VIND programme will enable the whole sequence of operations leading to a safer and more secure Vinča nuclear site to become effective.

3.3 Results and measurable indicators:

- a) Offices and facilities with equipment and control room are upgraded and occupied on a regular basis by representatives of the regulatory body, the emergency response team, and the Vinča radiation protection staff.
- b) Mobile meteorological-ecological laboratory in operation.

- c) Gap analysis for radiological capabilities and support services completed and recommendations documented and reported to the Ministries of Science and Environmental Protection and to the regulatory body. Where appropriate, plan may be used to identify additional EU assistance requests.

3.4 Activities:

- Assistance in adaptation of vacated office building no. 55 so as to provide proper offices facilities and control room for (1) representatives of the regulatory body, (2) members of the emergency response team (MEST), (3) members of the radiation protection staff, (4) secure equipment storage for radiation protection equipment and orphan source search and secure equipment, and (5) hosting the early warning system. Detailed designs will be produced as one of the key subtasks.
- Procurement of a mobile meteorological-ecological laboratory to complete the full capability for emergency preparedness.
- Assistance in developing a comprehensive radiological assessment gap analysis, upgrade plan, and expert validation of radiation safety programme and systems. The intent is to identify gaps in the process of harmonisation with EU basic safety standards. This will include a review of the following subcomponents:
- Implemented organisational radiation safety service with allocated resources (offices, telecommunications, equipment, human resources, methodologies etc).
- Completed procedures, guides and standards, and other relevant administrative infrastructure elements for complete implementation of operational radiation protection consistent with EU Council Directives Euratom.
- Appropriate technical support significant for radiation protection control and measurements, in operation providing proper and on time safety assessments of practices and events.
- Provide additional experts as needed for progress assessment, on site assistance, problem resolution, verification of achievement of performance indicators.

All these activities will be supported through a European Community Contribution Agreement with the IAEA (see Annex V).

3.5 Conditionality and sequencing:

Not applicable

3.6 Linked activities:

All the other phases of the VIND programme

3.7 Lessons learned

Since 2004 the implementation of the VIND programme under the coordination of the IAEA is proceeding according to the time schedule. However, the latest developments of this programme showed that supplementary technical expertise would be required for the monitoring taking into account the increasing number of projects being implemented and their high technical complexity.

4. Indicative Budget (amounts in €)

Activities	TOTAL COST	SOURCES OF FUNDING										
		EU CONTRIBUTION				NATIONAL PUBLIC CONTRIBUTION					PRIVATE	
		Total	% *	I B	INV	Total	% *	Central	Regional	IFIs	Total	% *
<u>Activity 1</u>												
<u>contract 1</u>	167 000	157 000	94		157 000	10 000	6				0	0
<u>Contingencies (about 5%)</u>	6 000	6 000	100		6 000	0	0				0	0
<u>TOTAL</u>	173 000	163 000	94		163 000	10 000	6				0	0

Amounts net of VAT

* expressed in % of the Total Cost

Additional Funding from Government, IAEA and Other Contributors

As discussed in preceding paragraphs, this project is intended to support the Vinča Institute Nuclear Decommissioning (VIND) programme, which is Serbia's priority nuclear safety and radiation protection support programme. For more than 40 years, Serbia was the central collection centre for all disused sealed sources and radioactive waste from the former Yugoslavia, including countries which are now EU Member States. These sealed sources and wastes are found in rooms and degraded storage facilities located all over Vinča. Only a few of the thousands of disused sealed sources and the thousands of waste containers have ever been conditioned, and the conditioning methods for those few items does not meet current international standards. Construction of proper waste processing facilities, secure storage facilities, and source conditioning facility, as well as conditioning and storage of the resultant wastes and sources, is estimated to cost more than EUR 8 million.

VIND is also intended to repatriate more than 8000 highly enriched and low enriched spent fuel elements to Russia from the RA Research Reactor. The total cost of the repackaging, transport, spent fuel reprocessing, and disposition of the resultant waste will exceed EUR 25 million.

Finally, decommissioning of the RA Research Reactor and degraded support facilities, including site-wide radiological characterization, remediation or resolution of identified sources of radiation and contamination, and upgrading the capabilities of the radiation protection programme, is estimated to cost an additional EUR 25 million or more.

The VIND programme has been in progress since 2004 and has received more than EUR 16 million in contributions through 2008 from sources other than the EC; this includes nearly EUR 9 million in support from the Serbian Ministry of Science. An additional EUR 14 million is currently approved for 2009-11, including EUR 10 million from the Serbian Ministry of Science. The EC has committed to a EUR 5.46 million through a 2007 Contribution Agreement.

A summary of the VIND funding approvals is included in the following table. It should be noted that funding for decommissioning activities, sealed sources, and waste management decline sharply in 2009-11, as the government, IAEA, and other contributors are shifting their financial resources toward spent fuel repatriation. However, it is still anticipated that the Ministry of Science will contribute more than EUR 1 million annually to waste management and decommissioning activities, mostly in terms of local labour resources.

Existing VIND Funding Approvals

Spent Fuel Repatriation Project (€)/ Phases 1, 2 and 3 of the programme			
	2004-08 Funding	2009-11 Funding	Total
European Commission	885 000	3 545 000	4 430 000¹
IAEA	1 910 152	526 667	2 436 819
Nuclear Threat Initiative (NGO)	2 578 820	-	2 578 820
USA *	550 000	2 666 667	3 216 667
Russia *	-	-	-
Total	5 923 972	6 738 333	12 662 305

* IAEA is negotiating with USA and Russia additional funding of more than €6M each.

Sealed Sources and Waste Management (including Nuclear Security) (€)/ Phases 4 to 7 of the programme			
	2004-08 Funding	2009-11 Funding	Total
European Commission	715 000	315 000	1 030 000²
IAEA	1 065 724	200 000	1 265 724
Nuclear Threat Initiative (NGO)	334 333	-	334 333
USA	566 667	300 000	866 667
UK	40 000	40 000	80 000
Slovenia	30 000	40 000	70 000
Total	2 751 724	895 000	3 646 724

Decommissioning (€)/ Phases 8 to 10 of the programme			
	2004-08 Funding	2009-11 Funding	Total
European Commission	-	-	-
Nuclear Threat Initiative (NGO)	125 671	-	125 671
IAEA	314 618	-	314 618
USA	6 833	-	6 833
Total	447 122	-	447 122

Serbia Funding from Ministry of Science (€)	
	2004-08 Funding
2004	500 000
2005	800 000
2006	1 100 000
2007	2 500 000
2008	4 000 000
2009-2011*	10 200 000
Total	19 100 000

* 2.5M/year + estimated 2.7M for fuel repatriation contract

Total Known Funding to VIND, excluding EC Funding (€)			
	2004-08 Funding	2009-11 Funding	Total

¹ Under the 2007 IPA horizontal programme on nuclear safety and radiation protection

² Idem

Total	16 422 818	13 973 333	30 396 151
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5. Indicative Implementation Schedule (periods broken down per quarter)

Contracts	Start of Tendering	Signature of contract	Project Completion
Contract 1	N/A	Q1 2009	31 December 2011

6. Cross cutting issues

6.1 Equal Opportunity

The project will benefit both women and men through improvements in environmental protection and safety. On all activities, both men and women will have equal opportunities to compete for contracts and to work on any related activities.

6.2 Environment

This project will improve radiological conditions within the Vinča site and the surrounding environments by reducing the potential for release of radioactivity via groundwater, airborne activity, or malicious intent. All radioactive materials, sources, etc. will be removed from areas of little control and placed in proper storage, including extensive radiological characterization and conditioning; this will ensure graded levels of security and radiological controls so as to reduce the impact on the environment, workers and the general public.

6.3 Minorities

On all activities, minorities will have equal opportunities to compete for contracts and to work on any related activities.

ANNEXES

- 1- Log frame in Standard Format
- 2- Amounts contracted and Disbursed per Quarter over the full duration of Programme
- 3- Description of Institutional Framework
- 4 - Related laws, regulations and strategic documents:
- 5- Details per EU funded contract

ANNEX 1: Logical framework matrix in standard format

LOGFRAME PLANNING MATRIX FOR Project Fiche	Programme name and number – 2008 IPA Horizontal Programme on Nuclear Safety and Radiation Protection	2008/020-350
Strengthening radiation safety capabilities and infrastructure of Vinča Institute	Contracting period expires – 2 years following the date of the conclusion of the Financing Agreement.	Disbursement period expires – 3 years following the end date for contracting
	Total budget including 5% contingencies: EUR 173 000	IPA budget: EUR 163 000

Overall objective	Objectively verifiable indicators	Sources of Verification	
The radiation protection programme for VIND and the emergency preparedness capabilities of the Vinča Institute have been upgraded to improve support and response capabilities.	a - Building 55 equipment and control room upgraded and occupied on a regular basis. b - Mobile meteorological-ecological laboratory in operation. c - Gap analysis for radiological capabilities and support services completed and recommendations documented.	a - Physical inspection of facility; final report. b - Physical observation; final report. c - Final report.	
Project purpose	Objectively verifiable indicators	Sources of Verification	Assumptions
To contribute to the implementation of the Vinča Nuclear Institute Decommissioning project (VIND) that is coordinated and partly supported by the IAEA through the enhancement of the radiation protection and emergency preparedness capabilities of the Vinča Institute.	Facility renovated for radiological, regulatory and MEST functions; mobile meteorological lab in service; gap analysis completed.	Renovated facility, mobile lab, final report.	Vinča and Ministry of Science must re-designate Building for these purposes.
Results	Objectively verifiable indicators	Sources of Verification	Assumptions
6.1 - Building no. 55 at Vinča upgraded to support the MEST team, host radiological early warning system, secure storage of orphan source search and secure equipment, regulatory body, and radiation protection staff.	6.1 – Building 55 renovated for intended purpose and occupied accordingly.	6.1 – Building renovated and occupied.	6.1 – Vinča and Ministry of Science must re-designate Building for these purposes.
6.2 - Mobile meteorological-ecological laboratory procured, delivered and operational with trained staff.	6.2 - Mobile lab in service.	6.2 – Mobile lab in service.	6.2 – None
6.3 - Gap analysis completed for radiation protection support for VIND programme; report and recommendations provided to stakeholders.	6.3 – Report on gap analysis and recommendations complete.	6.3 – Final report available.	6.3 – None
Activities	Means	Costs	Assumptions
All the following activities should be contracted through a Contribution Agreement with the International Atomic Energy Agency. At this stage, the number of contracts or sub-contracts identified so far for each beneficiary country is only indicative.			
6.1.1 - Tender offer for, and implementation of, detailed architectural re-design of building no. 55 at Vinča so as to upgrade the telecommunication and network services, offices, and control room for (1) representatives of the regulatory body, (2) members of the emergency response team (MEST), (3) members of the radiation protection staff, (4) secure equipment storage for radiation protection equipment and orphan source search and secure equipment, and (5) hosting the early warning system; cost estimate to be included.	6.1.1- Contract for architectural re-design for Bldg 55.	6.1.1 = 3,000	6.1.1 – Bldg 55 redesignated by MoS for this intended use.
6.1.2 - Tender offer for, and implementation of, upgrades to building no. 55 at Vinča in accordance with the design developed in activity 6.1.1.	6.1.2- Contract to initiate upgrades to Bldg. 55.	6.1.2 = 28,000	

6.1.3 - All equipment installed, and upgraded building commissioned and occupied.	6.1.3- Contract for installation of equipment and commissioning.	6.1.3 = 7,000	6.1.3 – Equipment already available or provided by MoS.
6.2.1 - Develop specifications for mobile meteorological-ecological laboratory.	6.2.1- Local expert to develop specifications.	6.2.1 - Funded by MoS	6.2.1 – MoS agrees with specifications, ownership, secure storage, and intended use.
6.2.2 - Procurement of a mobile meteorological-ecological laboratory to complete the full capability for emergency preparedness.	6.2.2- Procure mobile laboratory.	6.2.2 = 61,000	
6.2.3 - Training on operation of mobile laboratory.	6.2.3- Two expert lecturers x 1 week each.	6.2.3 = 7,000	6.2.3 – Lab delivered and commissioned.
6.3.1 - Tender offer to assist in developing a comprehensive radiological assessment gap analysis, upgrade plan, and expert validation of radiation safety programme and systems. The intent is to identify gaps in the process of harmonisation with EU basic safety standards. This will include a review of the following subcomponents: <ul style="list-style-type: none"> • Implemented organisational radiation safety service with allocated resources (offices, telecommunications, equipment, human resources, methodologies etc). • Completed procedures, guides and standards, and other relevant administrative infrastructure elements for complete implementation of operational radiation protection consistent with EU Council Directives Euratom. • Appropriate technical support significant for radiation protection control and measurements, in operation providing proper and on time safety assessments of practices and events. 	6.3.1- Contract for gap analysis; 3 experts.	6.3.1 = 41,000	
6.3.2 - Other expert and staff travel for progress assessment, on site assistance, problem resolution, verification of achievement of performance indicators. (Applies to all activities.)	6.3.2-EM11 - Expert or staff assistance.	6.3.2 = 10,000	

ANNEX 2: amounts (in €) Contracted and disbursed by quarter for the project

Contracted	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011
Contract 1	163 000 Including about 4% contingencies											
Cumulated	163 000 Including about 4% contingencies											
Disbursed	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011
Contract 1	8 000	26 000	93 000	36 000								
Cumulated	8 000	34 000	127 000	163 000								

ANNEX III: Description of Institutional Framework

The responsibilities for the fields related to the peaceful use of nuclear energy (health, the environment, science and technology, nuclear safety and radiation protection, agriculture, transport, etc) rest with several ministries.

The Ministry of Science (MS) is responsible for R&D in the nuclear sector, for nuclear safety, nuclear materials and radioactive waste management in the country. Under the Ministry's competence and financing are the R&D, including the Vinča Institute of Nuclear Sciences, the Institute of Technology of Nuclear and Other Mineral Raw Materials (ITNMS), the Institute of Geology, the Institute of Nuclear Energy Application in Agriculture (INEP) and others. The Ministry ensures that the law on the nuclear safety and the related regulations are carried out and provides the financial resources for the activities. The MS is responsible for bilateral and multilateral international scientific-technical co-operation of Serbia, including the cooperation with the IAEA.

The Ministry for Environmental Protection (MEP) is responsible and leading in radiation protection and monitoring of the environment, emergency planning etc.

In force is the Law on Protection against Ionizing Radiation that was enacted in 1996 (46/96). It establishes measures for the protection against ionising radiation, as well as nuclear safety measures, liability for nuclear damages, supervision and authorization, penalties. Based on the Law on Protection against Ionizing Radiation, there are 11 regulations related to protection against ionizing radiation and for the safety of radiation sources and 5 regulation related on nuclear safety and security.

Currently, there is no effectively independent Serbian regulatory body for radiation and nuclear safety. Law 46/96 does not make provision for the establishment of a regulatory body, although it makes reference to the 'competent Ministry'. Currently, in accordance with the *Law on Ministries*, the Ministry of Science and Ministry of Environmental Protection are identified as the competent Ministries.

A temporary regulatory body called the 'Regulatory Commission on Radiation and Nuclear Safety' has been established by the Ministry of Science to administer the decommissioning of the research reactor at the Vinča Institute, the shipment of spent nuclear fuel to the original Russian supplier, and the treatment of radioactive waste.

The Vinča Institute of Nuclear Sciences was founded in 1948. It is the main institute involved in research and applications in nuclear science (since 1968 multidisciplinary, not only nuclear) and covers a wide range of scientific and engineering fields; 800 employees, out of which 400 is research staff, organized in 16 laboratories (actually departments) from Nuclear Physics, Theoretical Physics and Physics of Condensed Matter, Radiation and Environmental Protection, Nuclear Engineering to Multidisciplinary Research and Engineering which are, to a large extent, independent.

The Radiation and Environmental Protection Laboratory covers: environmental radioactivity control, ionization radiation dosimetry, metrology analyses, radiation protection, radioactive waste arrangement and decontamination, reactor dosimetry, instrumentation servicing and operative dosimetry. The Nuclear Engineering Laboratory covers: reactor physics, safety and control of nuclear reactors, nuclear engineering and radiation protection. Together with the

Reactor Department, it is responsible for two research reactors: RA (shut down for decommissioning) and RB (zero power, requiring upgrading).

The RA research reactor went into operation in 1959 and has been shut down since 1984 due to fuel corrosion problems and for the refurbishment of the reactor control and safety system. Since the date, it stays with a partially loaded core containing 480 fuel slugs with 80% enriched uranium. In addition, 6656 spent fuel slugs with 2% enriched uranium and 884 slugs with 80% enrichment are located in a spent fuel storage pool containing about 200 tons of stagnant water of poor quality to minimize the corrosion process.

ANNEX 4: Related Laws, Regulations and Strategic Documents

Project-Specific Documents

- Decision of the Serbian government to decommission the RA research reactor located at the Vinča Institute and approval of the VIND programme (2002 and 2004)
- Draft of the Serbian new Law on ionising radiation protection and on nuclear safety (2006) and existing Serbian Law on Protection against Ionising Radiation (1996)
- Article 110 of the draft SAA
- Nuclear Safety and Radiation Protection action of the multi-country MIPD programme

International Conventions and Treaties

Serbia is a party to the following instruments under the IAEA's auspices

- Agreement on the Privileges and Immunities of the IAEA
- Vienna Convention on Civil Liability for Nuclear Damage
- Convention on Physical Protection of Nuclear Material
- Convention on Early Notification of a Nuclear Accident
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

Serbia has signed but has not yet ratified the Optional Protocol Concerning the Compulsory Settlement of Disputes to the Vienna Convention on Civil Liability for Nuclear Damage.

As a party to the Treaty on the Non-Proliferation of Nuclear Weapons, Serbia has a Comprehensive Safeguards Agreements with the IAEA for the Application of Safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons.

ANNEX 5: Details per EU funded contract

This project together with the projects:

- Conditioning and secure storage of disused sealed radioactive sources;
- Decommissioning of Degraded Waste Storage Hangar No 1;
- Radioactivity survey;
- Characterisation and conditioning of radioactive waste
- Project Management Unit for EU supported projects;

which are all part of the VIND programme, will be supported through a European Community Contribution Agreement with the IAEA.

Specific contribution agreement will be concluded in accordance with the terms of the Financial and Administrative Framework Agreement (FAFA) between the European Community and the United Nations, signed on 29 April 2003, to which the IAEA has adhered on 17 September 2004.